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# FIRE RESCUE UNIT SPECIFICATIONS

## 1. FIRE RESCUE UNIT DESIGN

The following specifications describe minimum requirements for a fire apparatus vehicle designed for severe fire department service.

The materials specifications are considered absolute minimum. Exceptions will not be accepted or permitted since all raw materials of the specified type are available to all manufacturers. Since all manufacturers have the ability to shear, break and weld as these specifications require, all basic design requirements shall be complied with.

A custom cab and chassis shall be provided, designed and engineered specifically for fire service application. The design of the equipment shall be in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements which might cause injury to personnel or equipment.

The cab shall be specifically designed and engineered for the emergency vehicle market and the chassis shall be designed, engineered and manufactured by a professional truck builder with experience in producing and servicing Class 3 through Class 8 truck chassis. The chassis shall be assembled in an ISO 9001 certified facility to insure the highest level of consistent quality components and assembly procedures are utilized in support of long service life with minimum maintenance.

All oil, hydraulic, and air tubing lines and electrical wiring shall be located in protective positions properly attached to the frame or body structure and shall have protective loom or grommets at each point where they pass through structural members, except where a through-frame connector is necessary.

Overall dimensions for the apparatus shall not exceed:

Height 11 FT 5 inches (unladen)  
Width 8 FT 4 inches (not including the mirrors)  
Length 37 FT 3 .25 inches (excluding rear ladder to the roof)

## 2. ACCESSIBILITY

Parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for best accessibility.

Cover plates which must be removed for component adjustment or part removal shall be equipped, where possible, with quick-disconnect fastenings or hinged panels.

Drains, filler plugs, grease fittings, hydraulic lines, bleeders and check points for all components shall be located so that they are readily accessible and do not require special tools for proper servicing. Design practices shall minimize the number of tools required for maintenance.

All components shall be designed and protected so that heavy rain or other adverse weather conditions will not interfere with normal servicing or operation.

## 3. GENERAL CONSTRUCTION

The apparatus shall be constructed with due consideration to the nature and distribution of the load to be sustained and to the general characteristics of the service.

Compartment dimensions are subject to a plus or minus ¼" tolerance.

Overall Apparatus dimensions are subject to a plus or minus 1" tolerance.

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## 4. MATERIALS

Materials shall conform to the specifications listed herein. When not specifically listed, materials shall be of the best quality for the purpose of commercial practice. Materials shall be free of all defects and imperfections that might affect the serviceability of the finished product.

## 5. NAMEPLATES AND INSTRUCTION PLATES

All nameplates and instruction plates shall be metal or plastic with the information engraved, stamped or etched thereon. If metal, they shall be made of a non-corrosive material. Plastic plates shall not be used in exposed positions where they are subject to weathering.

Nameplates shall show make, model, serial numbers, and other such data necessary to positively identify the item. All plates shall be mounted in a conspicuous place with tamper proof fasteners.

## 6. CONSTRUCTION

- **FASTENERS:** Where fasteners are used in assembly on dust shields, pans, etc., screws with lock nuts, or with lock-washers shall be used. Sheet metal screws shall be used on any part of the apparatus other than mounting trim or moldings. Self-tapping machine screws shall not be used in blind holes and for attachment of identification plates.
- **TUBING:** All copper tubing used on the apparatus shall be encased in nonmetallic looms and be adequately secured to prevent movement. All tubing nuts used on copper tubing shall be the long shoulder type nuts.
- **WELDING:** Welding shall not be employed in the assembly of the apparatus in a manner that will prevent the ready removal of any component part for service or repair.

## 7. FIRE CHASSIS

The cab and chassis shall be an American La France Eagle 148" four-door raised roof aluminum tilt cab built specifically for the Fire Service. The cab shall be designed and engineered specifically for the rigors and ergonomics of emergency response. The cab and chassis shall be designed, engineered and assembled as a premium quality, integrated unit which provides for safe and comfortable entry and egress of firefighters properly clothed in full protective gear. The cab and chassis shall be a medium four-door aluminum tilt cab.

The cab and chassis, defined as an "incomplete vehicle", shall meet and/or exceed all applicable FMVSS and FMCSR, Title #49, U.S. Code Requirements for vehicles domiciled in the United States and all applicable CMVSS and Canada Transport Regulations for vehicles domiciled in Canada. The cab shall have passed all load and impact tests required for compliance certification with United Nations Agreement, "Standard for Protection of Cab Occupants", Regulation #29. A copy of test reports shall be available, upon request.

## 8. CUSTOM CHASSIS REQUIREMENTS

The chassis shall be designed, engineered, and manufactured by a professional truck builder with experience producing and servicing Class 3 through Class 8 truck chassis. The manufacturer shall provide service and parts availability twenty-four (24) hours per day seven (7) days per week via a franchised dealer employing certified truck and apparatus component service technicians.

The manufacturer shall provide a Customer Assistance Center staffed twenty-four (24) hours, per day, 365 days per year, by knowledgeable technicians who can provide service assistance by telephone and/or facsimile as well as locate the nearest available technician to provide specific apparatus component repairs whenever necessary.

The cab shall be specifically designed and engineered for the emergency vehicle market while the chassis shall be assembled in an ISO 9001-certified facility to insure the highest level of consistent quality components and assembly procedures are utilized in support of long service life with minimum maintenance.

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### 9. CHASSIS WHEELBASE

The chassis wheelbase shall be two hundred forty one (241) inches to the center of the tandem rear axles.

### 10. REAR FRAME OVERHANG

The chassis frame rail shall have an integral, rear frame overhang of ninety (90) inches from the centerline of the rear drive axle.

### 11. CHASSIS FRAME

The chassis frame shall be a heavy-duty ladder type frame utilizing 110,000 PSI yield strength, 11/32" material formed to a "C" channel shape with 3-1/2" flanges x 10-15/16" web. The section modulus shall be 17.21 cubic inches per rail and the RBM shall be 1,893,000 pound/foot per inch per rail. Each frame rail shall be mechanically punched for the components selected and shall bear the engraved vehicle serial number.

Crossmembers shall be formed steel and reinforced. A minimum of seven (7) crossmembers shall join the frame rails. Crossmember-spacing shall sustain the chosen Gross Vehicle Weight Rating, permit properly engineered installation of chosen chassis components and support a lifetime warranty against cracking of either rail in emergency vehicle service.

The rear of the frame shall be square and shall incorporate an inverted "Dog Bone" cross member allowing for service access between the frame rails to the top of the fuel tank from inside the rear compartment.

### 12. FRAME LINER

A "C" channel inner frame reinforcement shall be provided and installed. The inner liner shall be formed to a "C" channel shape to fit the contours of the main frame rail without exceeding the flange width. The overall insert length shall be 9" plus the wheelbase plus the rear frame overhang in length.

Combined, the section modulus for the 11/32" frame shall be 26.30 cubic inches, per rail, and the RBM shall be 2,894,000 pounds/foot per inch, per rail, with a yield strength of 110,000 psi, per rail.

### 13. FRAME FASTENERS

The chassis frame shall be assembled with huck-spin round collar fasteners. The huck-spin fasteners shall be installed with constant uniform torque, shall not loosen from vibration and shall not require re-torquing.

### 14. ENGINE

The engine shall be an electronically controlled, turbo-charged, six (6) cylinder, four-cycle, Detroit Diesel Series 60 engine developing 430 bhp at 2100 rpm. Peak engine torque shall be 1550 lb-ft at 1200 rpm.

The engine shall be 778 cubic inches (12.7 liter) displacement with bore and stroke of 5.12 inches x 6.30 inches (130 mm x 160 mm) and shall have a compression ratio of 16:1. The engine shall weigh dry 2,610 pounds (1184 kg) without additional equipment.

The engine fuel delivery system shall consist of six (6) electronic unit injectors (EUIs), one (1) for each cylinder. Each EUI shall be capable of providing fuel injector pressure up to 28,000 psi for complete and clean combustion. The engine shall utilize Detroit Diesel electronic controls for engine management.

A 5-year/100,000 mile warranty shall be provided for the internal components of the Detroit Diesel engine. Repairs shall be conducted by an authorized Detroit Diesel distributor or authorized sales and service facility.

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### 15. ENGINE STARTER

The engine starter shall be a Delco Remy 12 volt 42MT with over crank protection (OCP) and thermal protection, controlled by a dash mounted rocker switches and second switch for battery on/off.

### 16. AIR COMPRESSOR

The engine driven air compressor shall be a Bendix , 16.5 CFM airflow. The air compressor discharge line shall be stainless steel braid reinforced teflon hose.

### 17. FULL FLOW OIL FILTERS

Engine oil filters shall be engine manufacturer branded or approved. Engine oil filters shall be accessible and easily serviced or replaced.

### 18. ENGINE COMPARTMENT LIGHTS

Two (2) engine work lights shall be installed in the engine enclosure.

### 19. AIR CLEANER

The engine air cleaner shall be the size recommended by the engine manufacturer. The air cleaner element shall be manufactured from a fire retardant media and shall include an ember separator to resist flaming embers and shall be easily replaced by tilting the cab. The air cleaner shall be mounted on the right hand side of the engine.

The air cleaner intake shall be located on the right side of the cab, over the wheel well. The air intake shall be protected by a chrome grill with black wire mesh screen. It shall have a sealed system designed to prevent water from entering the intake pipe or air cleaner. The air cleaner shall include a moisture evacuator to allow discharge of condensation from the intake system.

A mechanical air inlet restriction gauge shall be visible through the in-cab service access door and shall trigger a dash mounted warning light in the event of an air inlet restriction.

### 20. RADIATOR

The radiator and entire cooling system shall meet or exceed NFPA cooling system standards. It shall be the largest unit available, but no less than a high capacity down flow 1164 square inch radiator. The radiator core shall be a 16 row louvered type with 3 serpentine tubes made of copper, with header plates made of brass. The radiator top and bottom tanks shall be non-corrosive, high temperature composite that are swaged to the core, not bolted.

The core shall be supported on both sides by a wrap around steel channel section with 2 lateral reinforcements between them. Each channel section shall be equipped with a gusseted mounting angle for attachment to a frame mounted offset bracket and a cantilever offset bracket for strut rod attachment. The mounting assembly shall dampen road shock and engine torque transmitted to the radiator.

The cooling system shall include a translucent surge and de-aeration tank. This tank shall have a sensor to warn the driver of a low coolant level via a red warning light on the dash.

The entire cooling system shall be capable of maintaining the engine manufacturers recommended engine operating temperature during all load conditions required by the engine manufacturer and expected emergency conditions. The radiator core shall be compatible with all commercial antifreeze solutions.

### 21. FAN DRIVE

The radiator-cooling fan shall be a 30", nine-blade Kysor nylon design with a Kysor K-22RA spring-on/air-disengage fan clutch. An automatic fan control shall be provided. The fan shall engage when the air condition system is on. As head pressure builds up in the A/C compressor, the fan shall cycle on and off.



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### 22. COOLANT HOSES

The chassis shall be equipped with Gates "Blue Stripe" coolant hoses. Hose construction shall be with EPDM (Ethylene Propylene Diene terpolymer). The hose wall construction shall reduce water permeation, decreasing radiator topping and coolant concentration imbalances. These hoses will provide a high durometer-clamping surface to prevent cold seepage. Constant torque hose clamps shall be provided for all coolant hoses of 1/4" diameter and greater.

### 23. HEATER HOSES WITH SHUT OFF VALVES

The chassis shall be equipped with a combination of flexible hose and formed hard line plumbing to provide flow of engine coolant fluid to the front and rear heater cores. Lines shall be routed to prevent being chafed or damaged by other components of the apparatus.

### 24. ENGINE COOLANT

Engine coolant shall be heavy-duty, pre-mixed, extended-life coolant. Engine coolant shall be treated with supplementary coolant additives (SCAs) required by engine manufacturers. Engine coolant shall provide anti-freeze protection to -34 degrees Fahrenheit – compliant with Detroit Deisel.

### 25. ENGINE PROTECTION ALARMS

The engine shall be equipped with an alarm system for low oil pressure, high coolant temperature and low coolant level to warn the driver of a potentially damaging engine operating condition. This warning system shall not shut down the engine or reduce power under any conditions.

### 26. ENGINE STOP CONTROL

The vehicle shall be equipped with a keyless ignition, two (2) dash mounted rocker switches, one off/on and the second battery off/on, which is easily accessible to the driver.

### 27. TRANSMISSION, ALLISON 4000 EVSPR WITH TRANSEND FLUID

The chassis shall be equipped with an Allison 4000EVSPR-with Retarder, six (6)-speed automatic transmission. It shall be equipped with WTEC operating controls and programmed for fire apparatus vocation.

An electronic oil level indicator shall be provided as well as a diagnostic reader port connection. A water-to-oil transmission cooler that meets the Allison 80% converter test and the Allison retarder cooling test shall be provided. The transmission shall be geared to provide one-to-one ratio in fourth gear which shall also be the fire pump drive gear. A dedicated lock-up circuit shall be provided for split shaft pump operation, if applicable.

The transmission shall be equipped with a retarder and a 7-position joystick controller. Up shall indicate the on position; down shall be the off position. The retarder shall provide 100% retarder in the "full on" position. Retarder springs shall be medium rating 1600#.

The chassis to transmission wiring harness shall utilize Metri-Pack 280 connectors with triple lip silicone seals and clip-type positive seal connections to protect electrical connections from contamination without the use of coatings.

A 5-year/unlimited distance warranty shall be provided for the internal components of the Allison transmission. Repairs must be conducted by an authorized Allison distributor or authorized sales and service facility. Claims shall be filed directly with American LaFrance.

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### 28. TRANSMISSION PROGRAMMING

The transmission shall be equipped with WTEC III software and shall be programmed for six (6) speed fire and emergency #3 non-pumper application. The 6<sup>th</sup> speed will be accessed with the mode button allowing 65 miles per hour.

### 29. RADIATOR DRAINCOCK

The radiator plumbing shall provide a draincock for coolant evacuation.

### 30. TRANSMISSION SHIFTER

An Allison "Touch Pad" electronic shift selector shall be located on the forward left side of the engine enclosure in close proximity to the power on/off, start switch and the park brake control. The fluid check feature shall be provided at the touch pad.

### 31. TRANSMISSION OIL COOLER

An external water-to-oil transmission cooler shall be furnished and installed on the apparatus. It shall be the largest unit available and, if possible, shall be set up for double by-pass operation.

### 32. AUXILIARY BRAKE

A transmission retarder with a dash-mounted 7-position joystick controller shall be installed to provide additional vehicle braking. Up shall indicate the on position; down shall be the off position. The retarder shall provide 100% retarder in the "full on" position. Retarder springs shall be medium rating 1600#. The joystick controller shall be mounted on the left side of the dash. The City shall approve location prior to installation.

### 33. PTO MOUNTING LOCATION

The PTO mounting location shall be the lower left side of the main transmission. It shall be mounted at the 7 o'clock position for the HD transmissions.

Driveline guard shall be installed on each individual driveline to prevent damage in the event of driveline failure.

### 34. FUEL TANK

The chassis shall be equipped with a 65-gallon rear mounted rectangular fuel tank that shall be constructed of steel alloy with stamped heads. It shall provide a minimum 65-gallon (246 liter) "draw" capacity on an incline in any direction up to 8 degrees. The fuel tank shall be certified to meet FMCSR 393.67 tests.

Dual pick-up, dual return ports and dual fuel level sender ports with a single 3/4" tank drawtube shall be provided for possible future requirements. A .25" atmosphere vent line shall be included. The bottom of the fuel tank shall contain a .75" magnetic drain plug that shall be recessed to prevent the plug from protruding from the bottom of the fuel tank.

The tank shall be spring mounted to the frame aft of the rear axle. Mounting shall include 2 steel straps protected against chafing the tank by form fitted rubber channels.

### 35. FUEL COOLER

The chassis shall be equipped with a Hayden air-to-fuel cooler to prevent loss of engine horsepower from rising fuel temperature.

### 36. FUEL FILL

The fuel tank shall be equipped with a 2.25" filler neck assembly with a .75" vent to prevent back splash at

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rapid filling rates and shall be located on the left side above the rear tires. The fuel fill cap shall have a lanyard.

### 37. FUEL PRIMER PUMP

The fuel lines shall be wire braid reinforced fuel hose with crimped brass fittings. The lines shall be carefully routed along the inside of the frame rails and protected against chaffing by non-conductive, frame mounted stand off fasteners. An auxiliary 12-volt electric fuel re-primer pump shall be supplied. The fuel pump shall have an oil pressure inhibit switch to prevent the pump from operating when there is no engine oil pressure. The system shall be activated by a momentary rocker switch mounted on the cab dash.

### 38. FUEL/WATER SEPARATOR

DAVCO #382 fuel/water separator with thermostatically controlled 200 watt electrically heated sight bowl, water sensor light and spin-on filter element with manual primer pump shall be frame rail mounted and fully accessible.

### 39. EXHAUST SYSTEM

Exhaust tailpipe shall be vertical design at passenger side of cab. Maximum height of exhaust stack shall not exceed 11' 9". Exhaust system components shall be equipped with appropriate heat shielding to minimize heat transfer outside of exhaust system.

### 40. FRONT AXLE

The front axle shall be a Meritor model FL-943 with a beam and spindle capacity of 20,000 pounds. It shall be provided with oil lubricated wheel bearings and a clear oil level-viewing window.

### 41. POWER STEERING PUMP

The power steering pump shall be a Vickers V20.

### 42. POWER STEERING RESERVOIR

The power steering reservoir shall have a capacity of four (4) quarts of power steering fluid.

### 43. STEERING GEAR

The steering gear shall be a TRW model TAS-85 with ram assist and rated at 21,500 pound capacity maximum.

Steering geometry shall be capable of 45-degree cramp angle, minimum, in both directions limited only by specified tires and wheels. Steering shall be achieved in five and three quarter (5-3/4) turns of the steering wheel from full left lock to full right lock.

### 44. FRONT SUSPENSION WITH SHOCK ABSORBERS

The front suspension shall be a taperleaf design with a capacity of 18,000 pounds. Front spring bushings shall be graphite impregnated bronze spring pin with grease seals. Heavy duty, double acting shock absorbers shall be provided.

### 45. FRONT BRAKES, S-CAM

The front brakes shall be Meritor "Q-Plus" 16.5" X 6" cam type with a capacity of 20,000 pounds. Ferodo or equal non-asbestos brake shoe linings, specifically designed for fire and emergency severe service, shall be supplied.

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### 46. SLACK ADJUSTERS FOR FRONT BRAKES

The front brakes shall be equipped with Meritor automatic slack adjusters.

### 47. FRONT AXLE SEALS

The front axle shall be equipped with Eaton Outrunner extended life oil seals.

### 48. FRONT BRAKE CHAMBERS

MGM tamper proof brake chambers shall be supplied for the front brakes.

### 49. FRONT TIRES

The front tires shall be Michelin XZY "super single" radial tires with all position tread. The tires shall be 385/65R 22.5 18 ply and shall have a GAWR of 18,740 pounds. Tires shall be speed-rated to maximum speed of vehicle.

### 50. FRONT WHEELS

Front wheels shall be Alcoa 823660 10-bolt, hub piloted aluminum disc, 22.5" x 12.25" with a maximum capacity of 21,000 pounds.

### 51. FRONT AXLE HUBS

The front axle shall be equipped with Con Met aluminum hubs.

### 52. POLISHED FRONT WHEELS

Each outer front wheel, outer surface, shall be polished.

### 53. TANDEM REAR AXLES

The rear axle shall be a Meritor RT-40-145 with a fire and emergency rating of 40,000 pounds. The axle set shall include single reduction hypoid gearing and oil lubricated wheel bearings. An air operated inter-axle lock with driver-operated control and engagement light shall be provided.

### 54. REAR AXLE RATIO

A gear ratio shall be selected for the specified drive train components to provide a top road speed of sixty-five (65) miles per hour (+/- 2 mph) in sixth gear.

### 55. MAGNETIC DRAIN PLUGS

The engine, transmission and rear axles fill and drain shall be equipped with magnetic plugs.

### 56. AXLE LUBRICANT

The axles shall be equipped with a petroleum-based lubricant.

### 57. REAR SUSPENSION

The rear suspension shall be Freightliner "Airliner" for tandem axles with a rated capacity of 40,000 pounds. It shall utilize rolling lobe-style air bags with dual leveling valves to maintain constant spring characteristics as the bags extend and compress from the running position.

The air bag system shall use an underslung, two leaf, parabolic spring to connect the frame rails, air bags and axle. The suspension shall have a steel c-channel crossmember and heavy-duty axle housing with welded axle seats.

## FIRE RESCUE UNIT SPECIFICATIONS

Shock absorbers shall be provided on both rear axles.

The rear axle suspension shall include transverse control rods to maintain rear axle alignment during severe and constant maneuvering over the life of the apparatus.

The rear axle spacing shall be 51".

### 58. REAR AXLE SEALS

The rear axles shall be equipped with Eaton Outrunner extended life oil seals.

### 59. REAR BRAKES

The rear brakes shall be Meritor "Q-Plus" 16.5" x 7" cam type for application with tandem drive axles. Ferodo or equal non-asbestos brake shoe linings, specifically designed for fire and emergency severe service, shall be supplied. Gunitite cast iron, outboard mounted, rear brake drums shall be supplied for drive axles.

### 60. SLACK ADJUSTERS FOR REAR BRAKES

The rear brakes shall be equipped with Meritor automatic slack adjusters.

### 61. REAR BRAKE CHAMBERS

The rear brake chambers shall be mounted with camshaft support brackets.

### 62. PARKING BRAKE CHAMBERS

MGM TR-T, tamper proof spring set parking brake chambers shall be furnished on each rear axle and supplied with a dash mounted Bendix PB-1 yellow handle push/pull control located convenient to the driver and reachable by the officer. This handle shall be set to "pop-off" at 30 lbs psi. A light located in the driver's dash panel shall illuminate whenever the park brake is activated.

### 63. REAR TIRES

Eight rear tires shall be Michelin XDN radial tires with drive position tread. The tires shall be 12R 22.5 14 ply and have a tandem GAWR of 46,000 pounds. Tires shall be speed-rated to maximum speed of vehicle.

### 64. REAR WHEELS

Eight rear wheels shall be Alcoa 883620 aluminum 10-bolt, hub piloted disc, 22.5" x 8.25" with a maximum capacity of 58,400 pounds.

### 65. REAR AXLE HUBS

The rear axles shall be equipped with Con Met aluminum hubs.

### 66. POLISHED REAR WHEELS

Each outer rear wheel, outer surface, shall be polished.

### 67. AIR BRAKE SYSTEM

A dual circuit, air operated braking system, meeting the design and performance requirements of FMVSS-121 and the operating test requirements of NFPA 1901, current edition, shall be installed. The system shall be powered by an engine mounted, gear driven air compressor.

The air system shall be plumbed with reinforced, color-coded nylon air brake tubing in conformance to SAE

## FIRE RESCUE UNIT SPECIFICATIONS

J844-94, Type B and U.S.D.O.T. Standards. The compressor discharge shall be plumbed with stainless steel braided hose lines with a Teflon lining. Nylon airlines shall be enclosed in high temperature convoluted loom run along the inside frame rails, secured with non-conductive, corrosion resistant strapping mounted with standoff fasteners. Cord reinforced rubber hose lines with brass fittings shall be installed from frame rail to axle mounted air connections.

A pressure protection valve shall be installed to prevent the use of air horns or other air operated devices should the air system pressure drop below 80 psi (552 kPa).

The chassis air system shall meet NFPA 1901, latest edition for rapid air pressure build-up within sixty (60) seconds from a completely discharged air system. This system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the sixty (60) seconds build-up time.

### 68. AIR DRYER

A Bendix model AD-IP air dryer with heater shall be installed on the frame rails under the cab. The Bendix dryer shall be used to maintain the warranty coverage on Bendix brake system components and shall provide an added 200 cubic inches of air capacity.

### 69. AIR TANK RESERVOIRS

The system shall provide a minimum of 4860 cubic inches of air supply with not less than three (3) reservoirs.

### 70. ADDITIONAL AIR RESERVOIRS

Two (2) additional air reservoirs shall be provided, each with a PP-4 pressure protection valve, which shall add 1400 cubic inches of air storage capacity for the air horn system.

### 71. AIR TANK DRAIN VALVES

Air tanks shall be equipped with manual drain valves operated by quarter-turn valves.

### 72. ABS BRAKING SYSTEM WITH TRACTION CONTROL

A Meritor Wabco, four-channel anti-lock braking system with four (4) wheel sensors and four (4) modulators to control and compensate braking force at each wheel shall be installed. A dash-mounted system diagnostic light shall be installed for servicing the system. The system shall prevent wheel lock-up during braking, thereby allowing the vehicle to accomplish a controlled stop while remaining substantially in the direction of travel at the time of brake application.

### 73. CUSTOM CAB, 148" FOUR DOOR RAISED ROOF ALUMINUM CAB DESIGN AND TESTING

The American La France Eagle 148" four-door raised roof aluminum tilt cab shall be designed and engineered specifically for the rigors and ergonomics of emergency response. The cab and chassis shall be designed, engineered and assembled as a premium quality, integrated unit which provides for safe and comfortable entry and egress of firefighters properly clothed in full protective gear. Safe and comfortable transport shall be afforded each occupant who is properly seated, restrained and attentive.

The cab interior shall be styled by professional automotive designers. The interior trim shall be tooled to support repeatable high quality fit-up and appearance as well as serviceable component access, interior surfaces shall be comfortable, easy to clean and long lasting under the rigors of contact with firefighter's clothing and personal safety equipment.

The access panel shall be hinged to permit routine engine fluid checks without the need of tilting the cab. The cover shall be of fiberglass sound deadening construction with a heavily insulated underside of multi-layer foam with a foil cover and retention pins. The top of the cover shall be vacuum formed vinyl.

## FIRE RESCUE UNIT SPECIFICATIONS

An extended dip stick tube for the 4000 EVSPR transmission so that the fluid level of the transmission shall be installed so that the fluid level of the transmission can be checked through the engine dog house without tilting the cab.

There shall be no cutouts in insulation in dog house area.

The cab and chassis, defined as an "incomplete vehicle", shall meet and/or exceed all applicable FMVSS and FMCSR, Title #49, U.S. Code Requirements for vehicles domiciled in the United States and all applicable CMVSS and Canada Transport Regulations for vehicles domiciled in Canada. The cab shall have passed all load and impact tests required for compliance certification with United Nations Agreement, "Standard for Protection of Cab Occupants", Regulation #29. A copy of test reports shall be available, upon request.

### **74. CAB CONSTRUCTION AND DIMENSIONS**

The cab outer skin dimension shall be 95.5" from side to side and 148" front to back. With appurtenances including door hinges, fenders, cab trim, hand rails and warning lamps, the outer dimension shall be 99.5" and 119" overall width including mirrors. The cab length shall be 74" from the front wall to the front axle centerline and 74" from the front axle centerline to the back of the cab. The inside cab width between closed doors shall be 89.75". There shall be a one piece, 1/4" thick, full height inner wall extending from the 1/4" thick front fire wall to the back vertical corner extrusion and shall extend from the roof side extrusion down to the bottom steps. All sheet and plate alloys shall be 5052-H32, and all extrusions shall be 6061-T6.

The cab width and length shall permit installation of two (2) seats in the front portion and up to six (6) seats in the rear portion. The rear cab section roof shall provide 72" clear standing room. The entire roof shall be aluminum, supported by formed hat section aluminum roof bows on 15" centers. The roof exterior shall be free of indentations and shall have a convex profile to provide water run off to the incorporated drip moldings over the doors.

The cab shall be completely insulated against heat and sound intrusion. The cab roof and sidewalls shall be covered with closed cell foam insulation. The cab dash insulation shall be covered with ABS form-fit paneling. The cab floor shall be completely covered by an insulated heavy-ribbed vinyl floor mat. The floor shall be insulated to minimize exterior noise intrusion. Cab interior noise shall not exceed 80 db at any seat position at 45 mph when the engine fan is not engaged

### **75. CAB DOORS AND STEPS**

The cab shall have four (4) side mounted, flush fit, barrier height doors which are weatherproof sealed. The front doors shall be 69.3" high and 32.5" wide. The rear doors shall be 79.3" high and 32.5" wide. The interior of each door shall be equipped with a flush mount, paddle latch handle with manual door locks. The exterior door locks shall be looped handle, locked with a key, and the interior locks shall be activated by a push/pull tab. All locks shall be keyed the same.

The cab shall be equipped with a bolt-on, expanded metal first step mounted under each door. The steps shall be contoured to the radius of the cab fender and shall protrude from the cab the same distance as the fender. The steps shall have an exposed safety grate. An enclosed second step shall be provided below the cab floor level. The first step shall be 8.5" deep x 26" wide and 20.75" from ground. The second step shall be 8.25" deep x 27" wide and 11.5" above the first step and 8.5" below the floor of the cab.

### **76. FRONT CAB SECTION**

The cab front shall be a curved, streamlined design with a centered radiator air intake. The air intake shall be designed to maximize airflow through a slat chromed grille. A non-removable mesh screen shall be installed behind the cab grille to provide radiator core protection from road debris.

The windshield base plane shall be set back from the front cab wall to permit an aerodynamic rearward sloping windshield and placement of wiper motors for optimal clearing surface area.

The windshield slope in combination with its proximity to driver and officer seating positions shall provide

## FIRE RESCUE UNIT SPECIFICATIONS

optimal upward visibility to identify overhead obstructions. Additionally, the officer and driver shall be able to see the ground surface 11.5 feet in front of the cab.

### 77. **CAB GLASS**

The cab doors and side windows shall have tinted automotive safety plate glass with solar management treatment to assist with the reduction of interior heat loading from UV penetration. The windshield shall be tinted laminated safety glass also with solar management treatment. The windshield shall be a curved, two (2) piece design, with replacement glass readily available from manufacturer's and dealer's stock. The chassis shall have dual heavy-duty bus, pantograph, wet arm windshield wipers, driven by electric motor. The wipers shall have a dash-mounted switch that provides a delay function for the wipers in the event of light rain, fog or mist.

The windshield shall be 3,370 square inches. Front door glass area shall be 683 square inches each. Rear door glass shall be 708 square inches each. Sidewall cab glass between the front and rear doors shall be 370 square inches each.

### 78. **FIXED SIDE WINDOWS**

The cab shall have fixed side windows, one (1) each side between the front and rear doors. They shall be tinted and include solar management treatment.

### 79. **DOOR WINDOW CONTROLS**

All cab doors shall be equipped with electric window regulators. Each window shall be operated by heavy-duty switches on the dash within easy reach of the driver and officer.

### 80. **HEADLIGHTS**

Two (2) rectangular halogen headlights, one (1) high beam and one (1) low beam, shall be installed in each cab front recessed headlight module.

### 81. **LED TURN SIGNALS & CORNERING LAMPS**

Each front turn signal lamp shall be a Whelen LED rectangular light mounted outboard of each front warning light, over the headlamps.

Two (2) LED lights, each with an amber contoured lens, shall be mounted to the side of the headlamp bezel. These lights shall be visible to side and front approaching vehicles. The housings shall be chromed plastic.

A heavy duty, non-polarity sensitive electronic flasher shall be provided to control the turn signal and emergency four-way flasher requirements.

Each side of the front bumper shall have a Whelen LED light with a white lens, surface-mounted. The lights shall be activated by the turn signal to illuminate passage through a turn.

### 82. **GRAB HANDLES**

There shall be four (4) exterior grab handles, one (1) at each door opening. The grab handles shall be 23-1/4" long, bright finish extruded aluminum with replaceable rubber insert grips. Four (4) additional grab handles, one (1) mounted at each of the "A" and "B" door pillars inside the cab on the hinge side, shall be installed. The interior grab handles shall be 11" long and shall be vinyl-covered. The grab handles shall be in compliance with NFPA 1901, current edition.

### 83. **SPOT LAMPS**

Two (2) Unity Halogen pillar-mounted spot lamps shall be provided, one on each side of cab.



## FIRE RESCUE UNIT SPECIFICATIONS

### 84. CAB MIRRORS

Two (2) side-mounted two (2) piece rear view mirrors shall be 15.5" high x 7" wide. The mirrors shall be heated and remotely adjustable by the driver. The mirrors shall be aerodynamically designed to reduce wind buffeting and resultant vibration. The housings shall be bright metal color – MZ Style.

### 85. CONVEX MIRRORS

Parabolic convex mirrors, 5.5" high x 7" wide, shall be installed below the primary mirrors on each side of the cab.

### 86. CAB FENDERS

The cab shall be equipped with polished stainless steel fender extensions that fit into the radius of the cab fender well. The fenders shall provide protection against water and mud spray onto the cab from the front tires.

### 87. FRONT & REAR MUD FLAPS

The front and rear wheel wells shall be equipped with anti-spray mud flaps. The mud flaps shall be installed behind the front and rear wheels and shall be attached with stainless fasteners.

### 88. CAB TILT MECHANISM

The entire cab shall tilt up, providing access to the drive train for maintenance and repair by a qualified technician. The cab shall pivot at the front, raised by dual hydraulic cylinders with velocity fuses. A mechanical cylinder lock and a push button control with plug-in tether cable shall be provided. The tether cable shall allow the operator to have a view of the area around the cab while the cab is in motion. A remote cylinder lock release shall be located in the left front door stepwell.

A 12-volt motor driven pump with a self-contained hydraulic oil reservoir and a manual backup pump shall be provided to power the tilt system. A monitor light shall warn the driver if the cab is not latched.

### 89. CAB MOUNTS

The cab shall be supported at four points. The front cab supports shall be pivot points to allow the cab to tilt to a minimum of 50 degrees for service and maintenance. This tilt angle will provide access to the engine area forward of the front axle.

The cab shall incorporate an air suspension system to support the rear of the cab. It shall consist of dual air springs with a shock absorber mounted as an assembly; one assembly shall be mounted on each side. The suspension shall allow the cab to move vertically up 1" and down 1".

The cab air suspension system shall minimize cab vibration and road shock, thereby extending cab life while protecting mounted equipment and providing fire fighters a quiet, more comfortable cab environment.

### 90. ALTERNATOR

The alternator shall be a Leece-Neville 320 amp, engine driven via a multi-groove polyvee belt and shall be automatically tensioned. The alternator shall meet all applicable NFPA 1901, current edition, requirements for performance.

### 91. BATTERIES

The battery system shall be a single system consisting of six (6) Group 31, 12-volt DC, heavy-duty, high cycle automotive batteries. The main battery bank of five (5) batteries shall have a group rating of 5375 cold cranking amperes (CCA) at zero degrees Fahrenheit and a reserve capacity of 1000 minutes with a 23 amp draw at 80 degrees Fahrenheit.

## FIRE RESCUE UNIT SPECIFICATIONS

The sixth, a high cycle 1075 CCA battery, shall provide isolated power to the engine and transmission electronic control units (ECUs). It shall have a reserve capacity of 200 minutes with a 23 amp draw at 80 degrees Fahrenheit. The isolated battery shall be left side frame rail mounted protected by the cab overhang. Charging of the isolated battery shall be through a circuit isolated via an electric solenoid. Battery isolators or diodes for isolation shall not be required or utilized.

The battery group shall be in two (2) trays mounted outboard each frame rail in a rigid cross-braced tray. Battery installation shall provide drainage for accumulated fluids and shall meet TMC (Truck Maintenance Council -American Trucking Association) recommended practice RP- 125 for battery mounting.

### 92. ELECTRICAL LOAD MANAGEMENT SYSTEM

The chassis shall be equipped with an integral fire and emergency vehicle electrical package, including the electrical requirements of the fire apparatus body and cab warning light devices, power distribution, load management, lighting administration, and interlock requirements as set forth and recommended by the National Fire Protection Association (ref. NFPA 1901, current edition).

The components of the electrical package shall be integrated into the system by an engineered wiring harness and interconnect system designed such that the system wiring, interconnects, warning control, load management, interlock system and associated documentation can remain unchanged, regardless of the vehicle lighting and interlock configuration.

The electrical package shall include an indicating interlock module; a programmable load management device; a warning light power distribution module, and an information display with system diagnostic capabilities.

### 93. BATTERY CHARGER

Two (2) 20 amp Kussmaul Super Auto Eject connections shall be provided (no exceptions), one to charge vehicle battery system, and one shoreline connection to charge portable communication radios. A Kussmaul Auto Charge battery charger with battery saver feature shall be supplied (no exceptions).

### 94. INTERLOCK CONTROL AND MONITORING MODULE

The electrical package shall be equipped with an interlock module and monitoring system which can be readily configured to meet the interlock requirements of various PTO and pump configurations, without wiring modifications from the pre-engineered harness and interconnect system. The module shall consolidate all interlock signals, relays and indicators and shall attach to the harness system through connectors. Independent relays dispersed about the apparatus for the purpose of pump and throttle interlocks shall not be utilized.

The interlock module shall also control and indicate the following functions: Transmission lockup command, high idle control logic with adjustable speed potentiometer for electronic engines so equipped, engine run/starter lockout relay, select switch for foot throttle inhibit during pump operation, and cab and body "door ajar" indication with relay for "door open" alarm.

### 95. LOAD MANAGEMENT SYSTEM (LMS)

The electrical package shall include an electrical load management system which controls the warning light switch bank, lighting system operational mode (scene/response), automatic high idle activation, NFPA recommended voltage monitoring, load sequencing, and load shedding functions. The system shall meet the requirements of various system configurations without wiring modifications from the pre-engineered harness and inter-connect system. The LMS shall consolidate all load management signals, relays and indicators and shall attach to the harness system through connectors.

The LMS shall monitor the main battery bank and shall be capable of monitoring a second, independent battery or battery bank (if present). The voltage detected on each of the battery banks shall be displayed by the load management system.

## FIRE RESCUE UNIT SPECIFICATIONS

The load management system shall be configurable so that any warning light or switch controlled by the system can be assigned (or reassigned) without additional wiring or modifications from the pre-engineered harness and interconnect system.

A control switch (or device) shall assign one of three possible modes of operation:

- 1) Scene Mode: The device can be turned "ON" only when the park brake is set.
- 2) Response Mode: The device can be turned "ON" only when the park brake is not set.
- 3) All Mode: The device can be turned "ON" without regard to park brake position.

A control switch (or device) shall be assigned to be dependent or not dependent, upon the Master Warning Switch. Devices which are not dependent on the Master Warning Switch shall sequence "ON" when the vehicle power is turned on. Devices which are dependent on the Master Warning Switch will sequence "ON" when the Master Warning switch is turned on.

Control switch (or device) shall be provided which can be assigned a priority level at which a given device is sequenced "ON" and "OFF" and at which point the given device is automatically shed (turned OFF) by the load management device during low system voltage conditions.

There shall be nine (9) levels of priority programmable for any given device connected to the load management system. Devices will be sequenced "ON" from priority 0 (PO) to priority 8 (P8). Devices will sequence off from P8 to PO. When load management is enabled, devices assigned P8 shall be shed first, while P1 is to be shed last. PO devices shall not be shed by the load management control. Any control switch (or device) can be assigned two modes for reactivation: Automatic - The load will reactivate when system voltage increases appropriately. SHED HOLD - The load will not reactivate once it is shed. The following load management functions shall be active whenever the chassis park brake is set:

The load management system shall be capable of activating the apparatus high idle system when the system voltage drops to an unacceptable level. The load management system shall activate the high idle feature before any devices are automatically shed OFF. The high idle function request from the load management device shall function only if the appropriate interlocks are present; that is, control of the high idle system shall be monitored and superseded by the state of the interlock control module. The automatic high idle system shall be deactivated whenever the brake pedal is pressed and shall remain inactive for two minutes thereafter to allow an operator to override the high idle function and return the engine to idle before pump or PTO engagement.

The load management system shall be capable of automatically turning off device loads when the system voltage becomes degraded. Loads shall shed according to their assigned priority levels. Electrical loads shall be turned off only after the system voltage drops to the given priority shed point for more than one minute. Once a load is shed, it shall remain off for a minimum of five minutes and until the voltage exceeds the given shed point by at least 0.2 volts (if it is programmed to automatically reset). If a load is programmed to remain off after it is shed, the given load shall remain off until the master switch is toggled or a "power-on" cycle (POC) is initiated.

The following load management functions shall be active in both scene and response mode. The load management system shall provide a low voltage output which meets the NFPA recommended timing and voltage levels. The load management system shall provide a warning if voltage measured on an attached secondary battery bank (or voltage source) falls below 11.9 volts. The load management device shall support a user configurable load management output. The output shall be capable of being set at any voltage between 10.5 volts and 15 volts. If the Set Point is selected below 13.8 volts, the output shall activate when the voltage drops to or below the desired Set Point; this shall allow the output to be utilized to activate an auxiliary device or alarm at a user defined point. If the Set Point is selected at or above 13.8 volts, the output shall activate when the voltage rises to or above the Set Point; this shall allow the output to be utilized to activate an over-voltage alarm at a user defined point.

## FIRE RESCUE UNIT SPECIFICATIONS

### 96. LOAD MANAGEMENT SYSTEM CONFIGURATION AND DIAGNOSTICS

The load management system features shall be easily configured through an on-board configuration menu. The system shall display the settings for each independent switch configuration and adjustable output.

The load management system shall provide visual indication of the following parameters:

Operating mode	Master warning switch status
Main battery voltage	Secondary battery voltage
User set point value	On/off indicator for each output
Output priority level	Load management enable input

### 97. POWER DISTRIBUTION SYSTEM

The electrical package shall incorporate power distribution modules (PDMs) as an integral part of the electrical system to supply power to all loads controlled by the load management system, including all warning lights, the air conditioning system, and all interior lighting. Each PDM shall be able to switch current to circuits via plug-in replaceable relays. Plug-in automatic, self-resetting circuit breakers shall also be provided. To minimize failures and voltage drop, each PDM shall have no point-to-point wiring and shall include integral connectors so as to be a plug-in component in the electrical system.

### 98. ELECTRICAL LOAD MANAGER INTERLOCK

The interlock module shall monitor and provide visual indication of the status (active/not active) and polarity (positive input/grounded input) of the NFPA-related interlock inputs, PTO shift switch, PTO engagement switch, park brake switch and neutral switch.

The interlock module shall also control and indicate the following functions: Transmission lock-up command, high idle control logic with adjustable speed potentiometer for electronic engines so equipped, engine run/starter lockout relay and cab and body "door ajar" indication with relay for "door open" alarm.

### 99. OFFICER INFORMATION CENTER

The electrical system shall include an information message center located in the dash of the cab, in view of the officer. The Officer Information Center (OIC) shall include and display:

- Vehicle speed when the park brake is not set. When the park brake is set, the numeric display shall indicate the status of the general purpose timer.
- Visual and audible indication of vehicle over-speed. The over-speed point shall be easily selected through the OIC.
- A general purpose start, stop, reset, style timer. The timer shall automatically start whenever the park brake is released. Thereafter, the timer shall be started, stopped or reset by user command.
- The time of day and outside ambient temperature. The clock style shall be user selected between a 12-hour and 24-hour type display.
- A response timer which shall automatically start when a power on cycle (POC) is initiated. The response timer shall stop when the vehicle has both exceeded 20 mph and after the park brake is set. When the response timer initiates or stops, a message shall be displayed indicating the timer status. The response time shall be retrieved and displayed by user command.
- Monitor and record scene time. The scene mode timer shall automatically start when the response mode timer stops. The scene mode timer will record time until both the park brake is released and after the vehicle speed exceeds 20 mph. When the scene timer initiates or stops, a message shall be displayed indicating the timer status. The scene time shall be retrieved and displayed by user command.

## FIRE RESCUE UNIT SPECIFICATIONS

- Monitor the interlock module and shall display an interlock status message whenever a change in the interlock system is detected. If several changes are detected simultaneously, the messages shall be queued and sequentially displayed. The following information shall be monitored and displayed, if applicable:

Park brake interlock	Neutral interlock	Panel throttle interlock
PRO shift interlock	Pump mode interlock	High idle interlock
PTO engage interlock		

- An indicator when the load management system is active. The load management messages shall be scheduled and displayed at regular intervals. The following information shall be available:

Load management active	Low Voltage
Shed level (give level being shed)	High idle

- Diagnostic information to assist maintenance and factory service personnel. Diagnostic information shall only be displayed when specifically requested from the OIC system menu. The following data shall be available on command:

Interlock module diagnostic data	Engine diagnostics
Load management diagnostic data	

### 100. CAB INTERIOR

The front dash area shall be styled into two (2) cockpits: one (1) in front of the driver and one (1) in front of the officer. They shall be separated by the insulated engine enclosure which shall have a contoured front, symmetrical with the dual cockpits. The center section of the dash shall bridge the engine tunnel and shall provide a central instrument and control panel accessible to both officer and driver. The center section also shall provide a generous service access for the main HVAC air ducting, dash mounted electrical power distribution modules, air brake control plumbing as well as the instruments and controls in the center dash.

Two (2) padded vinyl visors shall be installed across the entire windshield.

Daily engine/transmission inspection and service checks shall be accessed from inside the cab. There shall be a hinged access door at the rear of the engine enclosure. Fluids checked from inside the cab shall be engine oil, transmission oil, power steering fluid and windshield washer solvent. The engine enclosure shall be a flat rectangular shape with insulated ABS covering suitable for equipment mounting.

The driver's dash shall consist of an automotive, molded housing incorporating the main instrument and control panels with serviceable gauges, warning lamps and audio alarm. The instruments and controls shall be panoramically arranged for ease of locating, reading and understanding.

The officer's dash shall consist of a contoured, molded housing incorporating two (2) panels arranged panoramically.

### 101. STEERING COLUMN AND WHEEL

The steering column shall be tilting and telescopic, designed to collapse under impact. The steering column shall be capable of telescoping up to 2.90". It shall have infinite adjustment within its range of operation and shall be controlled by an air operated foot switch, allowing the driver to adjust the wheel with both hands. The steering column shall have a self-canceling turn signal switch with a headlamp dimmer switch, windshield washer switch and hazard flasher controls located in the control stalk.

An 18" diameter padded, light, gray steering wheel with a center horn button and four (4) grip spokes shall be provided.

## FIRE RESCUE UNIT SPECIFICATIONS

### 102. DRIVER AND OFFICER INSTRUMENT CONTROLS

The following instruments and warning lights shall be installed in the center panel directly in front of the steering column:

- Cab Unlatched warning light
- Low Coolant warning light
- Engine Air Filter Restriction indicator light
- Stop Engine warning light
- Electric Tachometer with Hourmeter
- Oil Pressure gauge w/warning light and alarm
- Electric Speedometer with Odometer
- Water Temperature w/warning light and alarm
- Transmission Temperature gauge with warning light and alarm
- Dual needle Air Pressure gauge with low air warning light and alarm
- ABS and ATC warning lights, Retarder warning light (when specified)
- Low Fuel Level and Water in Fuel warning lights
- Alternator warning light
- Turn signal indicators
- Headlight High Beam indicator
- Check Engine warning light
- Voltmeter with warning light and alarm
- Electric fuel level gauge
- Parking Brake Set indicator

### 103. DRIVER'S LEFT CONTROL PANEL

The following switches and controls shall be installed in the Drivers Left Control Panel.

Dash Lighting dimmer control  
Headlight switch  
Floor Lighting switch

Mirror Controls  
Intermittent Wiper on/speed control

### 104. DRIVER'S RIGHT CONTROL PANEL

The following controls shall be installed in the drivers right control panel:

Main HVAC controls

Touch Pad Transmission control

### 105. DRIVER'S FLOOR AREA

The following items shall be installed in the drivers floor area:

Steering Column and Wheel Controls  
Suspended Brake Pedal  
Air Horn Foot Switch

Foot Throttle  
Electronic Siren Foot Switch

### 106. CENTRAL DASH CONTROL PANEL

This panel shall be located between driver and officer and shall contain:

Master Power-On/Ignition-On/Start switch  
Parking Brake control  
Horn/Air Horn Selector switch

Fast Engine Idle switch  
Siren Control panel

## FIRE RESCUE UNIT SPECIFICATIONS

### 107. OVERHEAD CONSOLE

An overhead console shall run the width of the cab above the windshield and shall have a flared center section which sweeps back between the driver and officer. It shall be designed into the cab interior ceiling. An AM/FM weatherband radio with two speakers shall be mounted on the officer's side overhead console. The radio shall be mounted to the left side of the panel and a cut out shall be provided for a customer installed EMTREC control head. The dimensions for the cut out will be provided at the preconstruction conference.

### 108. OVERHEAD SWITCH CONSOLE

The built-in emergency light switch panel shall have one (1) master switch plus ten (10) individual switches for selective control. The switch panel shall be located in the "overhead" position above the windshield to allow for easy access and shall include one (1) LED red flashing "Cab Door Ajar" warning lamp and one (1) LED amber "Body Door Ajar" warning lamp. The warning lamps shall be activated if the parking brake is released while the engine is running. The emergency light "Master" switch shall be located on the driver's side within easy reach of the driver. The switches will be rocker type with an indicator light which is an integral part of the switch. There shall be two (2) switches with an internal indicator light installed in the light switch panel for future use.

**Switch layout shall be approved by the City before installation.**

Switch location and function:

<b>Master Warning</b>	1 Lightbar	2 Strobe	3 Side Warning
4 Rear Warning	5 Hdlt Flasher	6 Left Scene	7 Right Scene
8 Rear Scene	9 Blank	10 Blank	11 Strobe Diagnostics

Instrument panel gauges, vehicle lights, and other electrical accessories shall use properly sized wiring to accommodate expected current load. All wiring shall meet SAE J-1128 specifications for high temperature (250 degrees Fahrenheit minimum) conditions and shall be color, number and function coded. **There shall be an additional hot lead in the center lower dash for Knox Box.**

### 109. GAUGE TYPE

Dash gauges shall be black faced with white numbers and orange pointers and shall include English measurements only.

### 110. INTERIOR CAB LIGHTING

There shall be six (6) overhead dome light clusters, each consisting of one (1) red LED and one (1) white incandescent flush mounted lamp. Each white lamp shall illuminate upon opening any cab door and each white or red lamp shall be operable from the seat positions when the doors are closed. The lights shall be activated by pushing directly on the light. A clear gooseneck map light shall be provided on the Officer's side. A red courtesy light, mounted under the dash at the driver and officer positions, shall be controlled by a rocker switch mounted on the driver's instrument panel.

Each cab door shall be equipped with one (1) lamp located on the inner door panel. Both lamps shall illuminate whenever the cab doors are opened. The lamp closest to the outer door edge shall be red to warn approaching traffic of an opened door. The lamp closest to the door hinge shall be white with a 12-candlepower bulb which shall provide ground illumination and cab entrance step illumination in accordance with the requirements of NFPA 1901, current edition. Both lights shall be controlled by a door activated switch.

## FIRE RESCUE UNIT SPECIFICATIONS

Two (2) additional 8" white ceiling lights shall be installed in the cab rear (location to be determined at the preconstruction conference).

### **111. AUXILIARY 12-VOLT OUTLETS**

There shall be a total of four (4) automotive 12-volt auxiliary electrical outlets with covers. Two (2) shall be mounted on the central dash panel, and two (2) shall be mounted to the rear of the engine tunnel for accessory items.

### **112. HEATER, DEFROSTER AND AIR CONDITIONING**

The cab shall be equipped with a primary heater/defroster system with a fresh air inlet filter and air conditioning. The system shall provide environmental air treatment in accordance with published SAE standards. The defroster system shall include cold air returns across the top of the windshield to assist in the movement of air across the full height of the windshield without the necessity of auxiliary fans.

The heater and air conditioner shall have adjustable air outlets incorporated into the cab dash at torso and foot levels for optimum distribution of air. The front heater shall have a rating of 42,575 BTU/hour. The front air conditioner shall have a rating of 24,285 BTU/hour. Airflow shall be provided by a 350 CFM fan.

The primary heater and air conditioner re-circulation switch and manual air conditioner on/off controls shall be heavy duty truck design, utilizing large rounded surface knobs. The controls shall be located to the right of the driver forward of the transmission control for easy access by the driver.

### **113. AUXILIARY AIR CONDITIONING AND HEATING**

An auxiliary (crew area) heating and air conditioning system shall be integrated into the design of the cab. The auxiliary air conditioning evaporator unit shall be mounted in an overhead console and shall be rated at 21,190 BTU/hour. The auxiliary air conditioning shall have four (4) adjustable louvered vents positioned at the rear of the overhead console. The air flow shall be provided by a 350 CFM fan at the evaporator. A refrigerant compressor climate control shall be provided.

Two (2) auxiliary heaters shall have a combined rating of 36,760 BTU/hour, and one (1) shall be mounted in each rear-facing crew seat base. Airflow shall be provided by a 130 CFM fan at each heater. Both the auxiliary cooling and auxiliary heating systems shall be controlled by the crew person in the left side rear facing seat.

The auxiliary heater/air conditioner shall have controls mounted on the rear of the engine tunnel. The controls shall be heavy-duty truck design, utilizing large rounded surface knobs.

### **114. REFRIGERANT COMPRESSOR**

A Seltex refrigerant compressor shall be provided to power the primary and auxiliary air conditioner evaporators and shall be rated at 19.1 CFM. It shall be engine driven via a poly-groove power belt tensioned by a threaded rod.

### **115. AIR CONDITIONER CONDENSER**

A Red Dot R-4500 dual fan, roof-mounted air conditioner condenser shall be provided and installed.

### **116. HVAC PERFORMANCE**

The HVAC system shall be capable of, and tested for, cooling and heating a custom cab with a total open space of 360 cubic feet, and without occupants, to the following performance requirements:

Cooling:

The air conditioning systems shall reduce the in-cab temperature to 72 degrees Fahrenheit within 30 minutes from an ambient temperature of 110 degrees Fahrenheit and relative humidity, starting with a cold (ambient) engine.



## FIRE RESCUE UNIT SPECIFICATIONS

### Heating:

The heating systems shall increase the in-cab temperature to 80 degrees Fahrenheit within 20 minutes from an ambient temperature of 0 degrees Fahrenheit, starting with a cold (ambient) engine.

#### 117. **SHADOW GRAY VINYL INTERIOR**

The cab interior shall be a medium gray color. Accent trim shall be dark gray. The following interior components shall be consistent in material and color:

- The header and back wall shall be shadow gray padded vinyl.
- The engine tunnel shall be slate gray soft touch ABS.
- The upper panel of the doors shall be shadow gray soft touch ABS.
- The sun visors will be light and shadow gray padded vinyl.
- All dash panels will be dark gray powder coated aluminum.
- The overhead console shall be shadow gray molded composite.
- The floor will have black ribbed vinyl mats.

#### 118. **FRONT DOOR POUCHES**

The front door inner panels shall include storage pouches for personal equipment. The pouches shall be an integrated design constructed of vacuum-formed ABS material.

#### 119. **DOOR TRIM**

The interior of each door shall have a soft touch ABS panel trim on the upper and center sections. A stainless steel kickplate shall be installed, extending 11" up from the bottom of the door frame.

#### 120. **MOUNTING PADS**

Hard point mounting pads shall be provided on the engine enclosure. Six (6) in the cab, to accommodate equipment trays and future accessory mounting as required. Provide equipment tray and mapbook storage.

#### 121. **ANTENNAE MOUNTING**

Manufacturer shall install three (3) customer-supplied antennae (locations to be determined at pre-construction conference). Wiring shall be stubbed out for radios and the David-Clark system to driver, officer and a third location which will be determined at pre-construction conference.

#### 122. **DRIVER SEAT**

The driver's seat shall be a Seats, Inc., Model Universal high-back air suspension seat which shall be readily adjustable by the driver in accordance with SAE J1517. The seat shall be positioned to accommodate access as defined in SAE J833 and equipped with 9" fore/aft adjustment and vertical travel of 6".

#### 123. **OFFICER SEAT**

The officer seat shall be a Seats, Inc. Universal SCBA non-suspension seat with full seat cushion, dual head cushions and a fixed 95 degree high seat back. The seat shall incorporate 9" fore/aft travel on towel bar style tracks. A protective back panel shall be provided. There shall be a radio power unit storage compartment with dimensions of 10.5 inches high x 15.0 inches wide x 12.0 inches deep and shall be equipped with a hinged door and latch. A hot lead shall be wired into this installation (size of wiring to be determined at pre-construction).

## FIRE RESCUE UNIT SPECIFICATIONS

### 124. CREW SEATS, FORWARD FACING

The rear cab area shall contain two (2) forward-facing, high-back, non-suspended seats. The two (2) seats shall be mounted at the back wall in the center of the cab. The seats shall be Seats Inc. Universal series and shall not include provision for SCBA units. Seat backs shall be mounted flush to back wall.

### 125. AIR PACK BRACKET

One (1) Ziamatic air pack bracket shall be installed with a collision restraint strap and quick release lanyard for the SCBA officers seat in the cab.

### 126. IMPERIAL 1200/VINYL SEAT COVERS

All seats shall have bolsters and headrests and the surfaces shall be covered with solid color flat finish 44-ounce vinyl. The seat insert shall be of Imperial 1200 fabric with a minimum tensile strength of 900 lbs. wet or dry and a minimum tear strength of 200 lbs. on the warp and fill.

### 127. PARADE PANELS

Parade panels shall be installed on applicable SCBA seat backs.

### 128. OCCUPANT SEAT BELTS

The forward facing positions shall be equipped with three-point seat belts, each having a 7" vertical adjuster.

### 129. BUMPER WITH 4" EXTENSION

The front bumper shall be 10.0" high, two (2) rib contoured chaunel rolled from 10 gauge 304 stainless steel. Bumper shall be highly polished, have edge protecting molded end caps, and attached to a bolted frame extension 4" ahead of the center of the cab front. Winch receivers shall be provided both front and rear of the apparatus.

### 130. FRONT TOW EYES

Two (2) chrome-plated 3" tow eyes shall be mounted to the side of the front frame rail extension, extending up through the deck at a position which maintains an angle of approach compliant to NFPA 1901.

### 131. MAP BOOK RACK

A map book rack and tray shall be constructed of 1/8" smooth aluminum and DA finished, and installed on the engine doghouse. The rack shall hold 3 ring binder pages and dividers.

### 132. RECEIVER HITCH FRONT AND REAR

A Class III winch receiver shall be supplied front and rear. The receiver shall be designed to accept a portable winch and shall be designed in a manner that will allow the easy removal and installation of the winch.

The winch shall be secured by a steel pin that shall have a safety lock and chain. A weather tight 12-volt plug and cover shall be located near each receiver to supply power to the winch. Exact location of each receiver shall be determined by the City.

### 133. EMS CABINETS

Two EMS cabinets shall be provided and installed rear facing on each side of engine cover at the left and right side rear of the cab interior. (This is the area where the rear facing seats normally are mounted.) The cabinet shall be fabricated of 1/8" DA finish aluminum with approximate dimensions of 20.00" wide x 17.00" deep x 64.00" high, provided with one (1) fixed horizontal divider at 31.25" and two (2) 1/8" DA finish

## FIRE RESCUE UNIT SPECIFICATIONS

adjustable aluminum shelves, one (1) above and one (1) below the divider. The door shall be an ROM anodized roll-up. Two additional compartments shall be provided on the back wall, one on each side of the front facing seats. These compartments shall have the same features as the rear facing compartments.

### 134. ALUMINUM TREADPLATE ON CREW CAB ROOF

The rear portion of the crew cab roof shall be overlaid with 1/8" aluminum treadplate extending from the back edge of the roof forward and full width, inboard of the roof radius area.

### 135. LIGHT TOWER ENCLOSURES

An aluminum treadplate enclosure shall be provided for each light tower for added protection from overhanging limbs and branches.

### 136. FLIP DOWN DESK

A flip down desk shall be provided and mounted on the top of the engine cover. The desk shall be provided with a shelving area for binders and books. Final design will be approved by the City before construction.

### 137. FLUID CAPACITY PLATE

A permanently mounted plate shall be installed in the driver's compartment. It shall identify the quantity and type of the following fluids used in the vehicle: Engine oil, engine coolant, chassis transmission fluid, pump transmission lubrication fluid, pump primer fluid (if applicable) and drive axle lubrication fluid.

### 138. SEATING CAPACITY PLATE

A permanently-mounted plate shall be installed in the cab, specifying the number of personnel the cab is designed to accommodate.

### 139. VEHICLE HEIGHT SIGN

Installed overhead and in clear view of the driver shall be a permanently mounted sign engraved with the overall height of the completed apparatus. Air Conditioner Evaporator mounted below raised portion of roof.

### 140. WARNING SIGNS

Warning signs shall be affixed to the rear panel and crew cab prohibiting personnel against riding on the outside of the vehicle and cautioning them to ride only inside the cab on the seats provided with seat belts fastened.

### 141. BODY DESIGN AND CONSTRUCTION

The apparatus body shall be entirely constructed of aluminum. The complete body framework shall be constructed from 6061T6 aluminum alloy extrusions, which shall comprise at least 45% of total body weight without doors (NO EXCEPTIONS). To form the framework, the extrusions shall be beveled and electrically seam welded, both internally and externally at each joint, using 5356 and 4043 aluminum alloy welding wire.

Each body corner shall be 3" x 3" aluminum 6061T6 alloy extruded corner section with 1/2" (.50) wall thickness and shall be welded as an integral part of the framework. The horizontal frame member extrusions shall be 3" x 3" aluminum 6061T6 alloy with (.250) wall thickness. The frame cross member extrusions shall be 3" x 3" aluminum 6061T6 alloy with 3/8" (.375) wall thickness. These cross members shall extend the full width of the body to support the compartments which follow the contour of the chassis frame rails. There shall be a minimum of four (4) of these cross members spaced from front to rear of the body.

The body shall be mounted by use of a minimum of 6 point spring loaded mounting system to allow chassis frame flex without undue stress on aluminum body during severe service situations.

## FIRE RESCUE UNIT SPECIFICATIONS

The wheel well frame shall be constructed from 3" x 3" aluminum 6061T6 alloy extrusions to permit an internal fit of fire apparatus quality aluminum tread brite. A polished aluminum wheel well trim ring shall be installed and shall provide a smooth surface and attractive appearance to the body. A circular wheel well liner shall be installed in body wheel wells.

All of the smooth aluminum plate and fire apparatus quality tread brite used in body construction shall be aluminum 3003 H-14 alloy. All horizontal surfaces, rear steps, running boards, walkways, compartment tops, and the rear body surface shall be welded aluminum fire apparatus quality tread brite. The front of the side compartments and lower gravel shield shall also be tread brite.

All body compartments shall be constructed from 1/8" (.125) formed aluminum 3003 H-14 alloy smooth plate. All compartment seams shall be sealed by using a permanent pliable silicone caulking.

The complete apparatus body structure shall be free from nuts, bolts, and other fasteners. Upon completion of the weldment, the body shall be completely sanded and deburred for the removal of all sharp edges.

The body shall be thoroughly sanded, cleaned, and primed in preparation for painting. Compartment doors shall be painted separately to assure proper paint coverage on body, door jams, and door ledges. Paint shall be an ultra high luster acrylic urethane paint. Removable panels of 1/8" (.125) aluminum plate shall be installed on front and rear inside faces of side compartment for access to concealed wiring.

### 142. ELECTRICAL

All electrical equipment installed by the apparatus body builder shall conform to the latest Federal standards as outlined in NFPA #1901. Wiring shall be color coded and function labeled every 3" on wire. Insulation labeling shall indicate what circuit the wire serves, ie: beacon, etc. All wiring shall have high temperature insulation. NO EXCEPTIONS. There shall be a minimum of two (2) extra wires in the harness. The wiring installed by body builder shall be run in a loom, braided throughout system and shall be protected by automatic circuit breakers of the reset type. All electrical equipment switches shall be mounted on a switch panel mounted in the cab convenient to the driver. Light switches shall be of the rocker type with integral indicator light to show when lights are energized. All switches shall be appropriately identified by back-lighted panel mounted legend inserts. A 40-amp relay shall control power to the light bar. The switch panel shall be recessed into a module which also supports the siren unit on the cab dash. Wiring and switches shall be rated for a minimum of 125% of circuit breaker capacity.

### 143. WHEELWELL LINERS

Built in smooth aluminum wheel well liners shall be installed in the rear body.

### 144. COMPARTMENT INTERIOR COATING

All compartment interiors and shelves shall be coated with line-X gray thermoplastic coating.

### 145. COMPARTMENT DOORS

Rescue Body, ROM brand roll-up doors shall be painted body color. Protective shields shall be installed under the door rollers in each compartment to prevent scratching of the exterior surface of the door.

### 146. DRIVER'S SIDE COMPARTMENTATION

Compartment sizes on the left side of the apparatus shall be as follows:

Compartment L1 shall be 58" wide x 42" high on the upper and 21" high on the lower. Depth in the upper is transverse. Depth in the lower is 24". Clear door opening shall be 52" wide x 63" high.

Compartment L2 shall be 47" wide x 42" high on the upper and 21" high on the lower. Depth in the upper is 30". Depth in the lower shall be 24". Clear door opening shall be 44" wide x 63" high.

## FIRE RESCUE UNIT SPECIFICATIONS

Compartment L3 over the rear wheels shall be 54" wide x 35" high and 30" deep. Clear door opening is 51" wide and 31" high.

Compartment L4 over the rear wheels shall be 54" wide x 35" high and 30" deep. Clear door opening is 51" wide and 31" high.

Compartment L5 behind the rear wheels shall be 63" wide and 25" deep. Clear door opening shall be 60" wide x 63" high.

A total of eight (8) air bottle compartments shall be provided on the drivers's side of the apparatus. These shall be located in the void space surrounding the rear tandem axles. Two (2) shall be located in front of the first rear axle, four (4) located between the two rear axles, and two (2) located to the rear of the second rear axle for a total of eight (8). The air bottle compartment shall be in the form of a round tube, minimum of 9" diameter, and shall be of adequate depth to accommodate different size air bottles. The flooring shall be rubber lined and have a drain hole. A stainless steel door with a chrome plated latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners (screws) and the body sheet metal.

### 147. PASSENGER SIDE COMPARTMENTATION

Compartment sizes on the right side of the apparatus shall be as follows:

Compartment R1 shall be 58" wide x 42" high on the upper and 21" high on the lower. Depth in the upper shall be transverse. Depth in the lower shall be 24". Clear door opening shall be 52" wide x 63" high.

Compartment R2 shall be 47" wide x 42" high on the upper and 21" high on the lower. Depth in the upper shall be 24". Depth in the lower shall be 24". Clear door opening shall be 44" wide x 63" high.

Compartment R3 over the rear wheels will be 54" wide x 35" high and 25" deep. Clear door opening is 51" wide and 31" high.

Compartment R4 over the rear wheels shall be 54" wide x 35" high and 25" deep. Clear door opening shall be 51" wide and 31" high.

Compartment R5 behind the rear wheels shall be 63" wide and 25" deep. Clear door opening shall be 60" wide x 63" high.

A total of eight (8) air bottle compartments shall be provided on this side of the apparatus. These shall be located in the void space surrounding the rear tandem axles. Two (2) shall be located in front of the first rear axle, four (4) shall be located between the two rear axles, and two (2) shall be located to the rear of the second rear axle for a total of eight (8). The air bottle compartment shall be in the form of a round tube, minimum of 9" diameter, and shall be of adequate depth to accommodate different size air bottles. The flooring shall be rubber lined and have a drain hole. A stainless steel door with a chrome plated latch shall be provided to contain the air bottle. A dielectric barrier shall be provided between the door hinge, hinge fasteners (screws) and the body sheet metal.

### 148. REAR ENTRY WALKWAY

A walkway shall be provided in the center of the apparatus body. The walkway shall be approximately 32" wide and full body depth. The walkway flooring shall be constructed of knurled treadplate aluminum to meet NFPA 1901 standards for walking surfaces.

A full height double pan door shall be provided at the rear with an upper and lower viewing window and locking D-ring handle.

### 149. WALKWAY TO TRANSVERSE DOORWAY

A doorway for "reach in" use only shall be provided at the forward wall of the walk-in area. A top-hinged door to swing inward shall be provided on the forward wall of the walk-in module. A second roll up-door

## FIRE RESCUE UNIT SPECIFICATIONS

shall be located on the rearward wall of the transverse module. A second rubber body gasket shall be provided around the opening to aid in leak prevention.

### **150. DRIVERS SIDE INNER COMPARTMENTS**

Compartment shall be provided full length at the ceiling area on the drivers side of the walkway. The compartments shall be approximately 33" deep and 30" high. (The width of each compartment shall be determined at pre-construction conference.) Each compartment shall be provided with an ROM anodized roll-up door.

### **151. PASSENGER SIDE INNER COMPARTMENTS**

Compartment shall be provided full length at the ceiling area on the passenger side of the walkway. The compartments shall be approximately 33" deep and 30" high. (The width of each compartment shall be determined at pre-construction conference.) Each compartment shall be provided with an ROM anodized roll-up door. Four (4) roll up doors shall be provided. (Location and size shall be determined at a pre-construction conference. Additionally there shall be three pull-out drawers 10" x 30" x 85", for suit storage. (Type and location shall be determined at a pre-construction conference.)

### **152. FLUORESCENT LIGHTING**

A total of four (4) 24" fluorescent light fixtures shall be provided and located on the ceiling of the apparatus walkway. The lighting shall be powered by the apparatus generator and shore power.

### **153. INNER BODY COMPARTMENT LIGHTS**

All inner body compartments and the walkway shall be equipped with automatic lights activated by opening the door. The compartment shall be illuminated by Truck-Lite 4" diameter recess mounted lights. Lighting shall be provided above and below fixed shelving. The ceiling in the walk-in area shall be illuminated by at least four (4) 8" round 12 volt lights which activate when the rear door is opened. Also, a "Door Ajar" indicator lamp shall be installed in cab, indicating when a compartment door is open.

### **154. TIMBER COMPARTMENTS**

An aluminum treadplate compartment shall be provided on the top of the body, one (1) oneach side. Each compartment shall be approximately 190" long x 25" wide x 13" tall with a horizontally hinged treadplate door on top. The compartments shall be located on the top outer edge of the apparatus body.

### **155. OUTER COMPARTMENT LIGHTS**

All outer compartments shall be equipped with four (4) automatic lights activated by opening door. Also, a "Door Ajar" indicator lamp shall be installed in cab, indicating when a compartment door is open. The compartment shall be illuminated by a Truck-Lite 4" diameter recess mounted light.

Option- Provide price for rope style compartment lights.

### **156. ACCESS LADDERS, 750 POUND CAPACITY**

One fabricated aluminum ladder shall be provided at drivers side rear of the body to provide access to the timber compartments. Ladder shall have non-slip rungs and shall be capable of supporting 750 pounds.

### **157. COMPARTMENT GRATING**

Black Turtle Tile, self-draining interlocking vinyl tiles with beveled edge caps, shall be provided on the floor, shelves and trays of each enclosed compartment.

## FIRE RESCUE UNIT SPECIFICATIONS

### 158. SHELVING

Ten (10) shelves shall be provided. The shelves shall be constructed of 3/16" smooth aluminum sheets. The front and rear edges shall be formed up 2". Adjustable shelves shall be mounted on adjustable track channels to provide height adjustment with simple standard hand tools.

### 159. ADJUSTABLE SLIDING TRAYS, 250 POUND CAPACITY

Six (6) adjustable trays shall be provided. The trays shall be constructed of 3/16" smooth aluminum sheets with at least a 3" lip formed around the perimeter and the corners welded. The trays shall be mounted on height adjustable channels and on full extension ball bearing slides with a minimum rating of 250 pounds per pair. A positive pressure hold open/close device shall be mounted on the underside surface of the trays to hold them in both the fully extended and fully-retracted positions. (Location to be determined at the pre-construction conference.)

### 160. ROLL-OUT VERTICAL TOOL BOARDS, 250 POUND CAPACITY

Six (6) roll out tool boards shall be installed. The tool boards shall be constructed of 3/16" smooth aluminum sheets with at least a 3-1/2" lip formed to the outer and inner edges for rigidity, and to serve as hand holds. Tool boards shall be mounted vertically, maximum height of the clear door opening on full extension ball bearing slides, with a minimum weight rating of 250 pounds per pair. Spring-loaded latches shall be mounted on the bottom corners of each tool board to hold them in the fully extended and fully retracted positions. (Location to be determined at the pre-construction conference.)

### 161. LOCATIONS FOR COMPARTMENT ACCESSORIES

The locations for all compartment accessories shall be determined at the pre-construction conference.

### 162. SCBA RACK

A 14-bottle SCBA storage rack shall be installed. Location of the rack shall be compartment #L2.

### 163. AIR CASCADE SYSTEM

The air cascade system shall include:

- Four (4) Taylor-Wharton individual storage banks (DOT approved) HC-4500 Lightweight cylinders
- Valve and safety burst disc on each bank
- Gauges for each individual bank
- Complete cascade fill panel with soft seat inlet and outlet valves for each bank, 0-6000 PSI self-relieving regulator, inlet and regulated pressure gauges, inlet filling from fill source, and two (2) fill lines with adapters for 4500 PSI filling with bleed valves
- All interconnected piping in either stainless steel tubing or 5000 PSI flexible hose

All piping shall be rated at 5000 PSI with 4 to 1 safety factor. The system shall weigh approximately 580 pounds with a capacity of 1776 cubic feet of air.

A Frag-Fill Station shall be installed on the apparatus which shall be constructed of black Duranodic non glare material.

System shall be in compliance with provisions of NFPA 21-2.11.1.

Low pressure regulator with low pressure air hose reel shall be provided.

All components of the system and location of installation shall be approved by City prior to installation.

### 164. 2-BOTTLE FILL STATION

A Bauer 2-bottle fill station Model CFS-2M shall be provided for use with a City supplied booster pump.

## FIRE RESCUE UNIT SPECIFICATIONS

Location shall be compartment R1. 220 volt power shall be provided to this compartment and there shall be Stub air supply to Sierra Master Line booster.

### 165. COMPARTMENT DIVIDERS

Compartment dividers shall be provided for all exterior compartments, usually at structural body posts between compartment doors.

### 166. NFPA WARNING LIGHT SYSTEM OPERATION (LED LIGHTING SHALL BE USED IN ALL LOCATIONS WHERE AVAILABLE)

The emergency warning light system shall be activated by rocker switches located on a panel mounted on the cab dash. The rocker switches shall have an internal indicating light to show when the switch is energized. Individual switches shall be installed to allow pre-selection of various components of the warning system. The switches shall be mounted in centrally located panel for easy service and identification. The electrical system components and wiring shall be readily accessible through panels for checking and maintenance.

The Optical Warning Device System shall comply with NFPA 1901 without exception. The system shall be divided into upper and lower warning levels. To minimize the load placed on the electrical system during apparatus start-up for an emergency response, a sequential switching device shall be installed to energize the optical warning devices. The warning system shall be divided into upper and lower warning levels. The optical warning system on the apparatus shall be capable of two separate signaling modes during emergency operation.

One mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. The other mode shall signal that the apparatus is stopped and is blocking the right-of-way.

There shall be a switch that senses the position of the parking brake. When the master warning system switch is closed and the parking brake is released, the warning devices signaling the call for right-of-way shall be energized. When the master warning system switch is closed and the parking brake is on, the warning devices signaling blockage of the right-of-way shall be energized.

The exterior housing of lamps, electronic devices, and fixtures shall be corrosion resistant and waterproofed. Electrical fixtures attached to the sides of the apparatus below the 75" level shall be near flush mounted. Fixtures shall not protrude more than two (2) inches, except for such items as spotlights.

Upon delivery, the apparatus manufacturer shall provide a "Certification of Compliance" of the warning system by one of the following means:

- Certification that the system was installed within the geometric parameters specified by the manufacturer of the system and referencing the optical source test reports provided by the manufacturer of the system.
- Certification that a mathematical calculation performed by a qualified person demonstrating that the combination of individual devices as installed meets the requirements of the current NFPA standard. This calculation shall be based on test reports for individual optical sources provided by the manufacturer of the device.
- Certification that actual measurement of the lighting system was performed after installation on the apparatus.

### 167. UPPER ZONE A CONTOURED CAB ROOF LIGHT BAR

An American La France light bar shall be mounted on the cab roof. This light bar shall be the consistent with the existing American La France Engines currently in service for the City of Sunnyvale. The light bar shall have 5 rotating lights (4 red and 1 white center mounted) and 2 red strobe. The light bar shall be



## FIRE RESCUE UNIT SPECIFICATIONS

installed to meet NFPA 1901 requirements for Zone A. The center section shall contain a clear halogen rotating beacon in a clear lens.

On each side of the center section, a red lens shall emit flashes from a 64 series linear strobe light. At the front corners of the cab a right angle red lens shall contain a clear halogen rotating beacon and dual direction polished reflector. Two (2) side facing sections shall each have clear lenses and a red halogen rotating beacon.

Two (2) Whelen Model 64 Opti-Scene lights with 13 degree prismatic inner lens shall be installed, one (1) on each side of the cab, inside the side facing sections of the light bar. Five (5) amber ICC marker lights shall be installed in the light bar along the front, bottom leading edge. There shall be red LED indicator lights at the switch console to indicate the selected lights are illuminated.

A steady red forward halogen shall be provided to meet California vehicle code requirements. It shall be installed above the headlights on the driver's side. A Whelen 64 series red strobe shall be installed above the headlights on the passenger side.

### 168. LOWER ZONE A

- (2) Whelen #60ROOFRR; 600 Series Wide Angle LED ,Red
- (2) Whelen 60AOOTAR: 600 LED Amber Turn

### 169. UPPER ZONE B AND D

- (4) Whelen #90ROOFRR; 900 Series Wide Angle LED Red
- (4) Whelen #9EFLANGE; Flange for 900 Series Lights

### 170. LOWER ZONE B AND D

- (4) Whelen #60ROOFRR; 600 Series Wide Angle LED, Red
- (2) Whelen #50ROOFRR; 500 Series Wide Angle LED, Red
- (2) Whelen #5EFLANGE; Flange For Above Lights
- (4) #6EFLANGE For Above Lights

### 171. UPPER ZONE C

- (2) Whelen #90ROOFRR; 900 Series Wide Angle LED, Red, Outboard Location
- (2) Whelen #60ROOFRR; 600 Series Wide Angle LED, Red, Inboard Location
- (2) Whelen #9EFLANGE; Flange For Above Lights
- (2) Whelen #6EFLANGE: Flanges For Above Lights

### 172. LOWER ZONE C

- (2) Whelen #CAST4
- (2) Whelen #60ROOFRR; 600 Series Wide Angle LED, Red
- (2) Whelen #60ROOXRR; 600 Series LED Brake Tail
- (2) Whelen #60AOOTAR; 600 Series LED, Amber Turn
- (2) Whelen #60COOWCR; 600 Series LED, Clear Back Up

### 173. ALTERNATING FLASHING HEADLIGHTS

A solid state flashing unit shall be provided for alternately flashing high beam headlights, and shall be controlled from the center overhead console. When high beam lights are required for driving while in the flashing mode, activating the high beam light circuit shall automatically cancel the flashing mode.

### 174. REFLECTORS

Chrome trimmed Track-Lite reflectors shall be installed on the apparatus in compliance with Federal Motor Vehicle Safety Standards and NFPA 1901.

## FIRE RESCUE UNIT SPECIFICATIONS

### 175. CLEARANCE LIGHTS

Five (5) red marker lights shall be installed at the rear of the apparatus body.

Two (2) amber marker lights, one each side mid-body, shall be installed.

Twelve (12) clear lens underbody worklights shall be installed under the body around the perimeter of the vehicle. The lights shall be strategically placed to illuminate the immediate ground area around the unit.

The lighting under the driver and crew riding area exits shall be activated automatically when the exit doors are opened. All other lights shall be switched on inside the cab on the cab switch panel. These lights shall be installed in compliance with NFPA 1901.

### 176. LICENSE PLATE LIGHT

A license plate bracket and light shall be installed on the rear of the vehicle. It shall be located at the left side of the vehicle towards road side center and shall be wired to come on with the headlights.

### 177. STOP, TURN, AND BACK-UP LIGHTS

Whelen halogen 6E series lights shall be installed in Whelen CAST3 polished cast aluminum triple lamp bezels, one (1) each side on the lower rear body corners. Each bezel shall be mounted with closed cell neoprene molding around the full perimeter contact surface area of the body to seal out moisture and eliminate electrolysis. The tail lamps shall be installed in the following descending order:

TOP	Amber Arrow Turn Signals - LED
CENTER	Red Stop/Tail Light - LED
BOTTOM	Clear Lens Back-up

### 178. TRAFFIC ADVISOR

A Whelen Traffic Advisor Model TA852L LED traffic directing light shall be installed at the upper rear body section and shall be recessed to protect the lights from damage. The Traffic Advisor shall have eight (8) L.E.D's and shall have a cab-mounted control console with LED status display and controls for the various patterns. The device shall have four (4) modes of operation: Arrow Left, Arrow Right, Center Out, and Alt Flash.

### 179. DUAL ELECTRIC HORNS

Dual electric horns rated at 400hz/500hz shall be installed under the cab, controlled through the horn ring on the center of the steering column and wired through a dash mounted selector switch, allowing control of either the electric or air horns.

### 180. PA/SIREN WITH SPEAKER

The chassis shall be equipped with a 200 watt electronic PA/siren. A remote control head shall be mounted in the cab center dash. The siren control head shall have red LED indicators to monitor speaker power.

Two (2) 100 watt speakers with cast aluminum housings with protection grilles shall be mounted in the center of the bumper.

### 181. FOOT SWITCHES

Four (4) foot-operated switches shall be furnished, two (2) each on driver and officer side. One shall activate the electronic siren, and one (1) shall activate the air horn.

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### 182. AIR HORNS

Two (2) bright finish Grover Stuttertone 21" air horns shall be mounted through the front bumper, one on each side. A horn/air horn selector switch shall be installed on the central dash panel for choosing either the dual electric horns or the air horns to be activated by the steering wheel horn button.

### 183. BACK-UP ALARM

A Preco model 1040 automatic self-adjusting electronic back-up alarm producing 87 - 112 db shall be installed at the rear of the chassis between the frame rails. It shall operate whenever reverse gear is selected.

### 184. GENERATOR - PTO DRIVEN

A Harrison 30.0 MPC – 16B/2A 30,000-watt hydraulic generator producing 120/240 volts at 1800 RPM shall be provided on the apparatus.

### 185. POWER TAKE-OFF

The generator shall be powered by a truck transmission mounted "hot-shift" power take-off. An illuminated 12-volt rocker switch PTO control with indicator light, without neutral interlock connection, shall be provided and mounted in the cab.

The installation shall include a soft-start feature.

### 186. ENGINE GOVERNOR SYSTEM

The generator system shall be equipped with a Fire Research FROG generator governor and engine control system that shall be mounted on the line voltage circuit breaker panel. The FROG governor system shall be compatible with the vehicle's engine.

The governor system shall automatically energize when the power take-off is engaged and shall immediately increase engine speed to generator frequency demand. The system shall automatically control the speed of the engine so that the generator output is a constant 60 Hertz, regardless of electrical load demand.

The FROG shall have four LED readouts to monitor generator output performance and display:

- Frequency output in Hertz
- Amperage draw line 1
- Amperage draw line 2
- Voltage output, alternating current
- Run time hourmeter

### 187. GENERATOR MOUNTING LOCATION

The generator shall be installed in a protected area within the chassis frame rails. Splash protection, if needed, shall be provided.

### 188. LINE VOLTAGE ELECTRICAL SYSTEM REQUIREMENTS

The specified line voltage power unit shall be installed with strict compliance with NFPA 1901 guidelines, and all associated components and equipment to be installed shall comply with NFPA 70 and applicable standards of the National Electrical Codes. Line voltage electrical system equipment and materials used with the system shall all be listed, properly installed in accordance with the manufacturer's instructions, and only in the manner for which they have been listed.

### 189. SYSTEM INSTALLATION AND WIRING

The generator system shall include proper grounding and bonding as required in NEC "Portable and Vehicle

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Mounted Generators". Non-grounded systems shall not be used. Only stranded or copper conductors shall be used for grounding and bonding purposes. An operator instruction plate and a generator rated performance specification plate shall be permanently installed at the circuit breaker control panel.

Wiring shall be properly installed from the circuit breaker panel to all specified 120/240-volt accessories, including permanent circuit identification and rating specifications, as applicable. Wiring materials used for the specified accessories shall be either THHN in non-metallic liquid tight flexible conduit or heavy duty SO copper cable. Either type of wiring shall be rated for 600 volts at not less than 194 degrees Fahrenheit.

Four (4) 4-gang 110 outlets shall be installed in rear cab area. (Location to be determined at pre-construction conference.)

Eight (8) 4-gang 110 outlets shall be installed in rear body area. (Location to be determined at pre-construction conference.)

### **190. LINE VOLTAGE TESTING REQUIREMENTS**

The line voltage electrical system and associated equipment shall be thoroughly tested, and the testing shall verify electrical polarity and that all wiring connections have been properly made. In addition, the system shall undergo a thorough operational test under full-load of the generator manufacturer's continuous duty power rating.

All system testing shall be performed when the apparatus is completed and in accordance with the requirements of NFPA 1901.

### **191. CIRCUIT BREAKER PANEL**

A circuit breaker panel shall be installed at eye level in the left front compartment and shall be wired to the line voltage power supply. The breaker box shall include a main circuit breaker, and up to 24 single pole circuit breakers, each of which shall be properly sized to suit the specified line voltage lights and accessories. The face of the circuit breaker control panel shall be permanently labeled with the circuit name or function designation of each individual breaker.

All individual circuit breakers installed in the circuit breaker panel shall be of the Ground Fault Circuit Interrupt type with the exception of the main circuit breaker.

### **192. ELECTRIC CORD REELS**

Two (2) electric rewind cord reels shall be provided with 150' of yellow 10/3 wire. These reels shall be located in compartments R-1 and L-1.

### **193. ACCESSORIES UP INDICATOR**

The extendable and telescopic devices shall have switches wired to a red flashing light conspicuous to the driver to indicate if these devices are not properly stored for travel. The light shall be labeled "Danger - Do Not Move Apparatus When Light is On". The warning light shall be wired to activate only when the push-pull parking brake has been disengaged.

### **194. 120-VOLT SCENE LIGHTS, SIDE OF BODY**

Two (2) Fire Research Focus, 500 watt, 120 volt quartz floodlight fixtures shall be recess-mounted, one each side on the rear of the body in the upper area. Cast aluminum lamp housings shall include high temperature white powder coated urethane finish, exterior trim, and proper heat dissipation. On-off switches shall be controlled from the circuit breaker panel.

### **195. 240-VOLT SCENELIGHTS, SIDE OF BODY**

Four (4) Fire Research Focus, 1500 watt, 240 volt quartz floodlight fixtures shall be recess-mounted, two each side in the upper body compartments front and rear side corner areas. Cast aluminum lamp housings

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shall include high temperature white powder-coated urethane finish, exterior trim, and proper heat dissipation. On-off switches (left pair and right pair) shall be controlled from the circuit breaker panel.

### 196. TWO (2) WILL-BURT FLOODLIGHT TOWERS

The apparatus shall be equipped with a two Will-Burt standard air-powered Night Scan Powerlites Model NS-15-9000 Optimum/DT. Both lights will be mounted on the top of the body module.

Each floodlight tower shall have the following features:

- Nested height : 11.6"
- Extended height: 15'
- Number of Sections: 4
- Maximum Operating Pressure: 35 PSIG
- Free standing design (does not require guy wires).
- High strength heat-treated aluminum alloy tubes and collars.
- All exterior aluminum surfaces shall be anodized and sealed for corrosion resistance.
- Fasteners and fittings shall be plated steel or stainless steel for corrosion resistance.
- Mast is pneumatically extended, only 20 PSI required.
- The chassis air brake system shall be equipped with a separate auxiliary air storage reservoir, specifically for the tower operation with a pressure protection regulator.
- A pressure regulator air filter and two (2) air gauges shall be installed next to the air operated manual "up-neutral-down" tower control.
- A position sensor shall be installed on the mast light and shall be wired to a red flashing light in the cab.
- For proper nesting, the unit shall include an "AutoStow" feature which automatically turns lamps off for added safety.
- The floodlights electrical power shall be supplied by a "Nycoil" power coil wired to a waterproof electrical box at the base of the tower. All wiring on top of the tower shall be fully enclosed in stainless steel panels. All wiring used in electrical installation of the tower shall be in proper conduit.
- Maintenance and instruction manuals for the tower shall be provided on delivery. The manufacturer's blueprint of the tower, complete parts list and bill of materials for the tower shall be included with manuals.
- Each tower shall include six (6) 1500-watt, 240-volt quartz Optimum floodlights.
- A pistol grip remote control with 25 feet of walk-around cable shall be mounted next to the circuit breaker panel and shall provide the operator with complete mast and light tower controls, including the single button AutoStow control.
- In accordance with NFPA 1901 requirements, a permanently installed tag shall be located on the circuit breaker panel that indicates the overall extended height of the mast light, as well as quartz lamp replacement information.

### 197. 12,000 POUND ELECTRIC WINCH

A 12-volt Warn Industrial Series 12, 12,000 lb. electric winch shall be supplied and installed. The winch shall have 3-stage planetary gears with an in-the-drum brake system and a direct acting positive clutch.

The winch shall come equipped with 125' of 3/8" wire rope with hook. A fair lead shall be installed on the extension to aid in the payout and rewinding of the cable. The winch shall be supplied with a minimum ratio of 261:1.

The winch shall be installed in a steel cradle for use at the front or rear. A 32-foot cable with remote controls shall be provided. The winch shall be installed in compliance with NFPA 1901.

### 198. PAINTING - GENERAL REQUIREMENTS

The final finishing of the apparatus shall be performed to the highest standards of the fire apparatus industry.

All removable components and accessories shall be fitted to the body and then removed prior to final

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finishing to assure that paint has been applied under all components and accessories.

Care shall be taken during paint preparation to properly fill all surface imperfections. Welded seam areas shall be ground flush and metal finished. Bare metal surfaces shall be etched chemically to insure proper adhesion. The primer shall be sanded to assure a smooth surface for painting.

The cab and body shall be finished using PPG urethane enamel paint for a high gloss and hard finish. One (1) pint of touch-up paint, including hardener to match each of the exterior colors shall be furnished upon delivery of the unit.

### **199. SINGLE COLOR CAB PAINT**

The chassis cab shall be painted to match FTB 75041 ALF Red. Manufacturer shall paint the chassis cab exterior with DuPont 6000 Series paint. The body shall be painted using a single color to match the cab primary color. The manufacturer shall ensure that the paint will match existing Sunnyvale American LaFrance apparatus.

The chassis frame and all frame-mounted components, less the engine and transmission, shall be painted with black high solids polyurethane paint.

The cab shall be painted using a single color.

### **200. SCOTCHLITE LETTERING**

There shall be 3" Scotchlite letters applied per City instructions. Sixty (60) letters shall be provided.

### **201. SCOTCHLITE STRIPING**

A triple band of white 3M Scotchlite shall be provided with the bottom edge of the band even with the top of the front bumper. The triple band shall consist of an upper band of 1" Scotchlite spaced an inch above a center 6" Scotchlite band, and another one inch space to a bottom band of 1" Scotchlite. The gaps showing between the triple bands will be apparatus color.

### **202. DETAILING**

The apparatus shall be thoroughly washed and detailed prior to delivery.